

# Full Report

## Pediatric Asthma

### Introduction

The National Asthma Education and Prevention Program (NAEPP) estimates that asthma is responsible for 10 million school absences annually; productivity losses due to parental absences from work to care for children with asthma are estimated to cost more than \$1 billion per year. Data from the National Center for Health Statistics, reported by the American Lung Association (2001), show a three-fold increase in the asthma-related mortality rate between 1979 and 1998 for children and young adults. Reduction of emergency room visits for asthma-related complications is a key health goal in the Virginia Healthy People 2010 program <sup>1</sup>. It has been well established that a disproportionate share of the disease burden associated with asthma in general, and pediatric asthma in particular, falls on those vulnerable individuals whose health care is provided through the Medicaid program (e.g., Brook et al., 1990; Falik et al., 2001; Pappas et al., 1997). Quality improvement efforts in this area promise to provide significant benefits to the individuals affected, the Virginia Medicaid program, and to society as a whole.

Fortunately, much of the mortality and morbidity associated with childhood asthma is preventable. The National Heart, Lung, and Blood Institute (NHLBI) has coordinated efforts to improve treatment and prevention of acute asthma through the development of practitioner guidelines for diagnosis and management of asthma. The National Asthma Education and Prevention Program (NAEPP) summarized the results of this effort in the *Report of the Second Expert Panel on the Guidelines for the Development and Management of Asthma*. The evidence reviewed in this expert panel report indicates that appropriate management of individuals with asthma can reduce mortality, morbidity, and societal costs. For this reason asthma is regarded as an ambulatory care sensitive condition (see, e.g., Billings et al., 1996; Bindman et al., 1995).

Ambulatory care sensitive conditions are medical conditions that are associated with avoidable or preventable hospitalization or other utilization markers (e.g., use of emergency departments) suggestive of less than optimal ambulatory care. Under this model, high rates of certain types of service utilization can be taken as indirect evidence of healthcare quality problems. Pediatric asthma is one of several ambulatory care sensitive conditions to which this general framework has been successfully applied. This literature suggests that the measurement and surveillance of disease-specific rates of emergency room or inpatient hospitalizations for children with asthma can provide useful information for policy makers who have an interest in evaluating the effects of various types of care delivery systems, as is currently the case in the Virginia Medicaid programs.

---

<sup>1</sup> (Objective 24-3; <http://www.vdh.state.va.us/hv2010/FObj2010.pdf>).

This study was designed to collect data that could be used to profile indirectly the quality of health care services provided to children and young adults diagnosed with asthma who are enrolled in the Virginia Medicaid programs. In addition, by providing performance feedback to the provider community and to Virginia DMAS, the report aims to encourage dialogue regarding the overall system of care with a focus on developing future intervention strategies designed to improve asthma service delivery for these enrollees.

## Purpose and Objectives

Delmarva Foundation, Inc., as the Virginia Medicaid External Quality Review Organization (EQRO), is charged with independently assessing the quality of health care services delivered to recipients enrolled in the Medicaid managed care programs, in order to ensure that high-quality accessible care, which is consistent with generally accepted standards, is provided. In order to accomplish this task, the EQRO scope of work included a focused quality of care study for children and young adults with asthma. The objectives of this study are to describe the pattern of care that is being provided for children and young adults diagnosed with asthma in Virginia Medicaid programs. These results are presented as a guide to the current status of care being delivered to Medicaid enrollees, with the goal of encouraging the development of systems of care for these children that will enhance the quality of healthcare that they receive.

## Pediatric Asthma Study Design and Methodology

The basic design was based on findings from published studies that have suggested that emergency room and inpatient hospital utilization rates can provide a useful and cost-effective approach to monitoring the quality of care for certain ambulatory care sensitive conditions, such as pediatric asthma. Study participants included Medicaid enrollees between two and twenty years of age who had at least one year of continuous enrollment and were diagnosed with asthma as identified through a review of the Medicaid administrative data. The study period was State Fiscal Year 2000 (July 1, 1999 – June 30, 2000). Data available for analysis included:

- Inpatient hospital claims and encounters
- Emergency room claims and encounters
- Outpatient claims and encounters
- Professional claims and encounters not associated with a hospital visit
- Pharmacy claims and encounters
- Medicaid Eligibility files

The data captured through analysis of these various data sets covering SFY 2000 were used to construct the utilization rates that are reported as quality indicators in the present study. These indicators are presented at the program level for the MEDALLION, Medallion II, and fee-for-service (FFS) Medicaid programs in Virginia.

## Preliminary Analyses

The criteria used to define study eligibility can impact the results of any study, as well as the reliability and validity of the findings. In the course of developing the final analytic plan for this study, Delmarva examined the administrative data provided by the Commonwealth to evaluate the effects of various definitions on utilization outcomes. The considerations that were evaluated included the method used to identify recipients with asthma and the criterion for length of continuous enrollment in one of the three Medicaid programs. The effect of using six versus twelve months continuous enrollment criteria was evaluated. In addition, two methods for identifying the asthmatic population were evaluated; the specifications developed by the National Committee for Quality Assurance for the Health Plan Employer Data and Information Set (HEDIS) versus any indication of an asthma-related ICD-9 diagnosis code.

The HEDIS criteria offer several alternate specifications for identifying persons with asthma. Some of the HEDIS specifications include evidence of commonly used asthma drugs. The analyses revealed certain internal inconsistencies in the data that suggested the possibility of pharmacy service-related gaps in data reporting. The data gap manifested in a pattern of results that appeared to exaggerate the rates of emergency room and inpatient hospital utilization under the more stringent of the HEDIS specifications. Further examination of the data suggested that these seemingly elevated rates were most likely due to a data problem rather than reflecting differences in the quality of care. In particular, because the HEDIS definition requires that specific asthma related prescribing events occur for an individual to be classified as having persistent asthma, the number of children identified as asthmatic would be lower than expected, if there was systematic underreporting of pharmacy services. In such an event, a higher proportion of identified asthmatics would have evidence of emergency room and hospital use; some asthmatic recipients who used medications but had no emergency room or hospital visits would fail to be identified, resulting in a falsely higher rate of undesirable outcomes. If such an effect were present and differentially affected the reported rates of pharmacy utilization for asthma-related medications within the programs, a serious bias could be introduced into the analysis. In fact, an examination of the details of study eligibility by program type indicated that only about 4% of the children identified as having asthma in the Medallion II program met the pharmacy criteria specified by NCQA. Additional investigation revealed that some of the plans within the Medallion II program had been unable to submit pharmacy claims for all or part of the study period because of a data processing system problem. Further analysis of the data suggested no such gap in non-pharmacy claims and encounters. These results suggested that the elimination of the pharmacy criterion for determining the asthmatic population would result in more valid outcomes.

Preliminary analyses also suggested that the length of the eligibility criterion had little independent effect on observed rates of the outcome measures. The 12-month continuous eligibility criterion was chosen for the ensuing analyses because this criterion provided the most valid representation of an individual's experience with the care provided by the assigned program type.

## Final Study Eligibility Criteria

Based on the results of the preliminary analyses and discussions with representatives of DMAS, the following final study eligibility criteria were established:

- The enrollee was required to be between the ages of 2 and 20 years as of the end of the study period; AND
- The enrollee was required to be continuously enrolled with the same Medicaid program for the full year of the study; AND
- The enrollee was required to have at least one mention of a diagnosis coded as 493.xx during the study period from any of the data sets examined, excluding the pharmacy data, within the study period of July 1, 1999 through June 30, 2000.

Each child that qualified using these criteria was considered to have a “diagnostic mention of asthma” for purposes of this study.

## Key Outcomes Assessed

The data captured from the various administrative data sources were analyzed to provide an assessment of the quality of care received by enrollees in Virginia Medicaid programs diagnosed with pediatric asthma. The key quality indicators are presented in Exhibit A. Delmarva's methodology was designed to provide qualitative information on program-wide outcomes related to these key quality indicators. It does not provide for case-mix adjustments or individual practitioner profiles. The data are best used for continuous quality improvement purposes.

Exhibit A: Overview of Key Pediatric Asthma Quality Indicators, Virginia Medicaid, SFY 2000

Indicator	Numerator	Denominator
Emergency Room Utilization Rate	Number of children with a diagnostic mention of asthma with one or more emergency room visit(s) during the study period	Number of children with a diagnostic mention of asthma in study
Inpatient Hospitalization	Number of children with a diagnostic mention of asthma with one or more inpatient hospitalization(s) during the study period.	Number of children with a diagnostic mention of asthma in study

## Results

**Demographic Characteristics.** In any investigation it is important to describe the population that is being studied in terms of basic demographic characteristics. This is especially true of studies in which the participants are members of pre-existing groups and have not been randomly assigned to the specific program conditions. For example, the Medallion II program was initially established in more urban areas of the Commonwealth. People eligible for coverage through the Medicaid program in those areas were therefore typically assigned to that program. Table 1 shows the demographic characteristics of study participants by program type.

Of particular note, the largest percentage of black enrollees was in the Medallion II program (83.3%), while the largest percentage of white enrollees was found in the MEDALLION program (55.6%). A larger percentage of older children were covered under the FFS program, while the largest percentage of eligible enrollees aged 6 through 11 years were in the Medallion II and MEDALLION programs. These differences in demographic characteristics should be taken into account when interpreting the utilization data. As noted above, these differences among programs may be driven more by the geographic location of the program.

**Table 1. Demographic characteristics of study participants by program type. Virginia Medicaid Programs, SFY 2000.**

		<b>Program Type</b>		
		<b>FFS N=613</b>	<b>Medallion II N=3,690</b>	<b>MEDALLION N=3,343</b>
<b>RACE</b>	White	43.2%	15.0%	55.6%
	Black	53.5%	83.3%	35.4%
	Other	3.3%	1.7%	9.0%
<b>GENDER</b>	Male	56.9%	57.2%	59.0%
	Female	43.1%	42.8%	41.0%
<b>AGE</b>	2-5 years	21.5%	32.0%	34.6%
	6-11 years	37.0%	40.3%	38.4%
	12-20 years	41.4%	27.7%	27.1%

*Note: Sums may not total to 100% due to rounding. One year of continuous eligibility in the same program category and at least one diagnostic mention of asthma in the administrative data were required for inclusion in the study.*

**Identified Prevalence Rate** The overall identified prevalence rate of asthma, as measured in this study, was approximately 7.4% for the study period. Of a total of 102,854 children aged 2 through 20 who met the one-year continuous enrollment criterion for the study, a total of 7,646 had a diagnostic mention of asthma in the administrative data examined. Table 2 shows the number of children who met the one-year continuous enrollment criterion as well as the number of children who met all of the study inclusion criteria by each program type. These data permit a comparison of the treated prevalence rate for each of the programs.

Table 2. Treated prevalence of pediatric asthma in Virginia Medicaid programs, SFY 2000.

Program	Numerator	Denominator	Treated Prevalence Rate
FFS	613	10,303	5.9%
MEDALLION	3,343	41,017	8.2%
Medallion II	3,690	51,534	7.2%
Aggregate (State Medicaid)	7,646	102,854	7.4%

*Note: One year of continuous eligibility in the same program category and at least one diagnostic mention of asthma in the administrative data required.*

The relatively higher identified prevalence rates for enrollees in the MEDALLION and Medallion II programs relative to FFS may reflect ongoing efforts in those programs to identify and treat children with signs and symptoms suggestive of asthma. These rates are within the range that would be expected based on published data regarding the prevalence of pediatric asthma.

**Rate of Emergency Room Utilization.** Overall, rates of emergency room utilization were comparable across the three Medicaid programs, as suggested in Table 3.

Table 3. Percentage of children at risk for asthma with an emergency room encounter during the study year by program type, Virginia Medicaid, SFY 2000

Program	Numerator	Denominator	Rate of Emergency Room Encounters
FFS	76	613	12.4%
MEDALLION	416	3,343	12.4%
Medallion II	575	3,690	15.6%
Aggregate (State Medicaid)	1,067	7,646	14.0%

Based on the demographic composition of the enrollees covered under each type of program, the Medallion II program, by posting an emergency room utilization rate comparable to the other programs, appears to be exceeding expectations.

In order to evaluate more formally the effect of program type on emergency room utilization while controlling for between-program differences in demographic characteristics logistic regression analysis was undertaken. Independent variables in the analysis were age (2- 5, 6-11, 12-20), race (white, black, other), gender (male, female) and program type (FFS, MEDALLION, Medallion II). The dependent variable was emergency room utilization. The only variable that contributed significantly to the model (i.e., met the 0.05 significance level for entry) was race ( $\chi^2 [2] = 83.6, p < .0001$ ). After controlling statistically for the demographic characteristics of the enrollees in the programs, no statistically significant differences between the three types of Medicaid programs were found.

### **Rate of Inpatient Hospitalization.**

Overall, rates of inpatient hospitalization were comparable among the three program types, as suggested in Table 4. The state Medicaid aggregate rate of inpatient hospitalization in the population studied was 5.7%.

Table 4. Percentage of children at risk for asthma with an Inpatient Hospitalization during the study year by program type, Virginia, SFY 2000



Program	Numerator	Denominator	Rate of Inpatient Hospitalization
FFS	30	613	4.9%
MEDALLION	182	3,343	5.4%
Medallion II	226	3,690	6.1%
Aggregate (State)	438	7,646	5.7%

Based on the demographic composition of the enrollees covered under each type of program, the Medallion II program, by posting an inpatient hospitalization rate comparable to the other programs, appears to be exceeding expectations.

Again, in order to evaluate more formally the effect of program type on inpatient hospitalization rate while controlling for between-program differences in demographic characteristics logistic regression analysis was undertaken. Independent variables in the analysis were age ( 2- 5, 6-11, 12-20), race (white, black, other), gender (male, female) and program type (FFS, MEDALLION, Medallion II). The dependent variable was inpatient hospitalization. Two demographic variables contributed significantly to the model (i.e., met the 0.05 significance level for entry): age ( $\chi^2 [2] = 23.7, p < .0001$ ) and race ( $\chi^2 [2] = 6.8, p < .04$ ). After controlling statistically for the demographic characteristics of the enrollees in the programs, no statistically significant differences between the three types of Medicaid programs were found.

## Discussion

Although this study was based on a well-established approach for evaluating the quality of care for ambulatory sensitive conditions using administrative data, the results offer a limited view of the quality of asthma care that is provided within the various Virginia Medicaid programs. Utilization of emergency room services and inpatient hospitalization appear comparable under all three programs. Based on the demographic composition of enrollees, it would be reasonable to expect poorer results for the Medallion II program. In general, greater preventable hospitalization and emergency room utilization has been reported for those with the lowest incomes, African Americans, and those residing in rural areas, due to access issues (Billings et al., 1996; Bindman et al., 1997; Pappas et al., 1997; Silver et al., 1997). In order for an observed difference between programs to be attributed to differences in the care delivery systems themselves, such differences must be greater than that expected simply because of the demographic characteristics of the members. No such independent program-related effects were found on either of the key outcome variables included in this report. It appears that the Medallion II program is performing on par with the FFS and MEDALLION programs on the outcomes measured in this study when the difference in demographic composition of the various programs is taken into account.

Although rates of hospitalization, emergency room visits, or complications for ambulatory care sensitive conditions are sometimes interpreted as reflecting access to primary care, alternative explanations are also possible. These include systematic differences in aspects of the etiology and progression of disease that can be affected by socioeconomic and economic variables. A variety of other barriers to care related to geographic location, transportation availability, or personal factors related to the propensity to seek health care may also be involved. Thus, the interpretation of observed differences (or the lack of such differences) in indirect measures such as those used in this study must be made with caution. Nevertheless, such indicators can be useful as a cost-effective mechanism for identifying potential quality problems that can be investigated in more detail. Despite the limitations of administrative data in general, and the present data sources in particular, the current results are consistent with the provision of reasonable access to care under all three of the Medicaid programs studied. At a minimum, the current work has developed the analytic capacity to use the existing administrative data system for population-based monitoring and surveillance for trends in utilization. This capacity may be of increasing value as the data systems used by the Virginia Medicaid programs mature.

Additional future studies are needed to fully address the quality of care provided along the six key dimensions of care suggested in the EP2 Guidelines for the Diagnosis and Management of Asthma:

- Signs and symptoms of asthma
- Pulmonary function
- Quality of Life/functional status
- History of asthma exacerbations

- Pharmacotherapy
- Patient-provider communications and patient satisfaction

Medicaid programs in Virginia may also consider building on the best clinical practices for children with asthma as described in the materials provided by the American Academy of Allergy, Asthma and Immunology (AAAAI), in partnership with NAEPP, and coordinated by the National Heart, Lung, and Blood Institute (see, e.g., <http://www.aaaai.org>). These materials convert the recommendations for asthma care based on the Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma (EPR-2) published by the NAEPP in 1997 into a user-friendly format designed to be functional in a clinical practice setting. These guidelines may help stakeholders refine measures that capture system improvements in quality of care delivered to children with asthma. Certainly clinician education is an important component of improving quality of care for children with asthma (see, e.g., Griffiths & Feder, 1999). However, providing clinical guidelines, even in a user-friendly format, may not be adequate to initiate the quality improvement process (see, e.g., Rolnick et al., 2000).

The present study reports data relevant to the quality of care for children with asthma in Virginia Medicaid programs throughout the state and for the three types of Medicaid programs, as reflected in the utilization data for emergency room visits and inpatient hospitalizations. However, it is important to keep in mind the study limitations. In particular, as has been noted elsewhere, the current analyses do not rule out a variety of alternative interpretations of the results including differences that might be attributable to demographic, geographic, case-mix, or similar factors. The data are thus most useful when viewed longitudinally from a quality improvement perspective.

It should be noted that the need to improve the quality of care provided to children and young adults with asthma is not unique to Virginia Medicaid programs. Finkelstein et al. (2000), for example, reported that although many primary care physicians are aware of (and reportedly read) the National Asthma Education and Prevention Program guidelines, self-reported compliance with many aspects of the guidelines remains lower than anticipated. Areas for improvement noted by Finkelstein et al. are likely applicable in Virginia Medicaid programs. Only about half of the physicians surveyed by Finkelstein, for example, reported providing written care plans for children and young adults with asthma.

Opportunities for improvement were noted by Diette et al. (2001) in a survey of parents of children being treated for asthma in a managed care setting. In particular, fewer than half reported having been provided with written instructions for handling asthma attacks or educated regarding procedures for adjusting the dosage of asthma medications before predictable exposures to asthma triggers.

Each Medicaid program or provider group is unique, and the specific areas or interventions that will be most appropriate are best determined by those with a detailed knowledge of the system of care in which the plan operates including the needs of the individuals served by the plan, the resources available to the plan, and a vision for healthcare improvement. However, the current study suggests consideration of several specific potential interventions. These include:

- Developing procedures to encourage better documentation of services that are provided;
- Developing reliable and valid methods for measuring severity of pediatric asthma
- Reinforcing potential improvements noted in asthma education, including specific disease management programs;
- Implementing programs to minimize risks associated with exposure to tobacco smoke;
- Measuring fewer, but more detailed, process and outcome indicators;
- Expanding functional status measures to include other aspects of health that are personally important to the individuals affected by asthma.

Regardless of the specific issues that are chosen for intervention, a consistent focus on continuous healthcare improvement is essential. Gallagher (2001), drawing on the work of Berwick and Nolan (1998), notes for steps for conducting a successful quality improvement program:

- Set aims
- Determine measures
- Generate ideas for change
- Test changes

The process is iterative, resulting in a continuous series of improvements over time. The concept is simple, but successful implementation is not easy. Data provided in this report has been designed to assess the current status of care delivered to children and young adults diagnosed with asthma who are enrolled in Virginia Medicaid programs. These performance indicators can suggest areas for improvement. Where possible the report has also presented information that may be useful in planning for interventions and in evaluating the effects of those interventions within an ongoing health care quality improvement framework. In future studies, Delmarva will extend the findings reported here to assist the stakeholders in Virginia Medicaid programs in developing successful approaches for improving the quality of healthcare, and the quality of life, for Medicaid enrollees in the Commonwealth.

## References

- Berwick D & Nolan T (1998). Physicians as leaders in improving health care: A new series in the Annals of Internal Medicine. *Annals of Internal Medicine*, 128, 289-292.
- Billings J, Anderson GM & Newman LS (1996). Recent findings on preventable hospitalizations. *Health Affairs*, 15(3), 239-249.
- Bindman AB, Grumbach K, Osmond D et al. (1995). Preventable hospitalizations and access to health care. *JAMA*, 274(4), 305-311.
- Brook RH, Kamberg CJ, Lohr KN, Goldberg GA Keeler EB & Newhouse JP (1990). Quality of ambulatory care: Epidemiology and comparison by insurance statistics and income. *Med Care*, 28(5), 392-443.
- Campbell DT & Stanley JC (1963). *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally.
- Dinette GB, Skinner EA, Markson LE, Algatt-Bergstrom P, Nguyen TT, Clark RD & Wu AW (2001). Consistency of care with national guidelines for children with asthma in managed care. *J Pediatr*, 138(1), 59-64.
- Falik M, Needleman J, Wells BL & Korb J (2001). Ambulatory care sensitive hospitalizations and emergency visits: Experiences of Medicaid patients using federally qualified health centers. *Med Care*, 39(6), 551-561.
- Finkelstein JA, Lozano P, Shulruff R et al. (2000). Self-reported physician practices for children with asthma: Are national guidelines followed? *Pediatrics*, 106(4, Supplement), 886-896.
- Funderburk FR, Pathak DS & Pleil AM (1998). Incorporating individualized quality of life measures in the evaluation of pharmacy services. *Pharmacy Practice Management Quarterly*, 17(4), 54-66.
- Gallagher C (2001). Initiating a pediatric office-based quality improvement program. *Journal of Health Care Quality*, March/April, 2001.
- Garrity TF (1981). Medical compliance and the clinician-patient relationship: A review. *Social Sciences and Medicine*, 15E, 215-222.

- Gergen PJ, Fowler JA, Maurer KR et al. (1998). The burden of environmental tobacco smoke exposure on the respiratory health of children 2 months through 5 years of age in the United States: Third National Health and Nutrition Examination Survey, 1988-1994. *Pediatrics* Electronic Pages, 101(2) <http://www.pediatrics.org>
- Goodman AK, Cashman JA, Cohen L & Outwater T (2001). *New York City Childhood Asthma Initiative*, accessed on line, 4/11/2001 <http://www.ahcpr.gov/news/ulp/managed/ulppubh3.htm>
- Griffiths C & Feder G (1999). Clinician education: A key to implementing asthma guidelines? *Quality in Health Care*, 8, 73-74.
- Homer C, Susskind O, Alpert HR, Owusu MS, Schneider L, Rappaport LA & Rubin DH (2000). An evaluation of an innovative multimedia educational software program for asthma management: Report of a randomized, controlled trial. *Pediatrics*, 106(1 pt 2), 210-215.
- Juniper EF (1999). Health-related quality of life in asthma. *Curr Opin Pulm Med*, 5(2), 105-110.
- Kemp JP & Kemp JA (2001). Management of asthma in children. *American Family Physician*, 63(7), 1341-1348.
- Lieberman DA (2001). Management of chronic pediatric diseases with interactive health games: Theory and research findings. *J Ambulatory Care Manage*, 24(1), 26-38.
- Pappas G, Hadden WC, Kozak LJ & Fisher GF (1997). Potentially avoidable hospitalizations: Inequalities in rates between US socioeconomic groups. *Am J Public Health*, 87(5), 811-846.
- Rich M, Lamola S, Gordon J & Chalfen R (2000). Video intervention/prevention assessment: A patient-centered methodology for understanding the adolescent illness experience. *J Adolesc Health*, 27(3), 155-165.
- Rolnick SJ, Flores SK, O'Fallon AM & Vanderburg NR (2000). The implementation of clinical guidelines in a managed care setting: implications for children with special health care needs. *Manag Care Q*, 8(2), 29-38.
- Shah S, Peat JK, Mazurski EJ, Wang H, Sindhusake D, Bruce C, Henry RL & Gibson PG (2001). Effect of peer led programme for asthma education in adolescents: cluster randomized controlled trial. *BMJ*, 322, 1-5.
- Shegog R, Bartholomew LK, Parcel GS, Sockrider MM, Masse L & Abramson SL (2001). Impact of a computer assisted education program on factors related to asthma self-management behavior. *J Am Med Inform Assoc*, 8(1), 49-61.

Silver MP, Babitz ME & Magill MK(1997). Ambulatory care sensitive hospitalization rates in the aged Medicare population in Utah, 1990 to 1994. A rural-urban comparison. *Journal of Rural Health*, 13(4), 285-294.

*Trends in Asthma Morbidity and Mortality*, American Lung Association, Epidemiology and Statistics Unit. January, 2001. [http://www.lungusa.org/data/asthma/asthmach\\_index.html](http://www.lungusa.org/data/asthma/asthmach_index.html) Accessed 8/20/01.

*Return to Managed Care*